

# **Tempe Fire Department Policies and Procedures**

## **Shoring Equipment**

### **409.07**

### **Rev 10-21-92**

This policy deals primarily with instructions for operating the shoring equipment carried on Support-73. For an explanation of trench rescue tactics and procedures refer to the policy and procedure on Trench Rescue. These two policies should be always be reviewed collectively. There are also Department training videotapes available.

#### **Support-73 Equipment**

- . Hydraulic shores; 5' and 2' with pump and release tools\*.
- . Hydraulic shore extensions; 4', 5', and 6'.
- . Screwjacks.
- . 1', 2', 6' lengths of pipe.
- . 4' X 8' sheeting (birch plywood).
- . 2' X 7' plywood sheeting.
- . 2' X 3-1/2' plywood sheeting.
- . 2" x 6" X 6' lumber (Douglas Fir).
- . Shovels.
- . Hand saw.
- . Hammer/nails.
- . Measuring tapes.
- . Buckets.
- . Small folding shovels.
- . Hand garden trowels.
- . Pliers

\* Hydraulic oil is mixed one quart to five gallons of water, which is the pump tank capacity.

This equipment is designed for protection of our personnel in a fast rescue attempt and can be set up in minutes.

After assessing the situation and location of victims, place sheeting on opposite sides of the area to be shored. Sheeting should also be used as a platform on the rim for weight distribution of personnel working there. Measurements need to be taken across the top of trenches that exceed three-feet in width. Measurements should be approximately one-foot down the wall from the rim of the trench. This will tell you the length of extension required for the hydraulic shores. (Note: If screwjacks and pipe assembly are to be used, measurements are reduced one-foot for the pipe assembly to allow room for the screwjack and base.)

When using screwjacks/pipe, assemble the pipe with couplings on each end to prevent thread damage. Assemble the pipe out of the trench and place the screwjack in one end and the base in the other.

Hydraulic shores are fast, powerful, and cover more surface area of the sheeting than screwjacks. However, screwjacks may be used in areas not accessible by hydraulic jacks, in odd-shaped excavations or collapses, or for just about anything that needs braced.

Hard-packed, stable soil may be shored with hydraulic shores without the use of sheeting. Maximum spacing, six-feet horizontal.

Hydraulic shores should be centered on the sheeting. When using two-foot shores, the vertical spacing should be four-feet with the top shore applied first.

When using screwjacks, 2" X 6"s should be used between the ends and the sheeting for increased surface area

strength.

## **INSTRUCTIONS**

Hydraulic shores with the proper extensions installed, are placed along the trench in the collapsed position with the hydraulic fitting on the bottom vertical rail. Maximum horizontal distance of six-feet (four-feet in unstable soil).

One man with the hydraulic pump raises the top vertical rail so that the shore is standing vertically. He then attaches the hydraulic line from the pump to the bottom vertical rail at the snap-on fitting. Place a "T" handle release tool on the bottom vertical rail handle, hook down. Collapse the shore.

Now, holding the top vertical rail handle in one hand and the release tool in the other hand, slide the shore into the trench. Release the top vertical rail handle, letting the shore fold out while holding it in position with the release tool in one hand.

With the other hand, pump hydraulic fluid into the cylinders, extending the shore. The valve on the pump is in closed position to operate and in the open position to bleed fluid or to connect the snap-on fitting. The pressure range for normal operation is 800 psi for unstable or sandy soil, to 1500 psi for stable or hard-packed soil.

Now grasp the hydraulic line in one hand (to protect the fitting from hitting the dirt when it is free) and slide the release tool over the snap-on fitting. A small prying motion will release the snap-on fitting, holding pressure in the shore. Remove the hose and attach it back to the pump and move to the next shore and repeat the process until all shores are in place.

To remove the hydraulic shore from the trench, attach the small nylon rope to the far vertical rail handle (or use someone with a release tool on the other side). Place the release tool through the near vertical rail handle, hook out. Place the end of the tool over the fitting and using a prying action, push the pin in on the fitting. This releases the hydraulic fluid and retracts the shore. The shore will now fall and be caught with the release tool. Pull the far side up to collapse the shore and remove it from the trench.

Screwjack shores are nailed in place on each end, starting from the top of the trench, centered on a 2" X 6" and sheeting, and tightened before moving down and installing the next shore. The top jack should be approximately one foot down from the rim of the trench and installed from outside the trench. The next one is placed down four feet vertical. The shores should be level and perpendicular to the trench walls. Retighten the top jacks.

Remove the screwjacks from the bottom up, releasing the top jacks from outside the trench.

### **Hydraulic Extensions**

The hydraulic pistons extend 12". The standard extensions on the shores range from 22" to 36". This is adequate for the width of most trenches.

For trenches wider than three feet, the 4', 5', or 6' extensions must be installed. Each extension allows for the 12" spread, so the 6' will extend from five-feet to six-feet.

Each extension consists of: an innersleeve, an outersleeve, a load transfer adapter, and two bolts with locking rings.

### **Assembly**

1. Remove the pin and bolt from the standard three-foot shore, then the socket pad on the rail, and lastly, the oversleeve.
2. Disassemble the extension. Place the load transfer adapter over the piston rod with the holes lined up.

3. Place the oversleeve over the piston and install a bolt through the oversleeve, load transfer adapter, and piston rod. Install lock ring.
4. Slide innersleeve into outersleeve and secure the socket pad on the rail to the outersleeve with the other bolt and lock ring.

Rescue efforts can begin as soon as the danger area is shored.

## **SAFETY FACTORS**

- . Minimum exposure of personnel in danger areas.
- . Assembly of shores done outside the trench.
- . Apparatus parked 100' from the trench if in use, 300' if not in use (vibration).
- . Use a hazard zone. Only working personnel near the trench.
- . Provide constant relief.
- . Men in trench wear SCBA and helmets.
- . Consider life lines. If a second collapse, the line will lead you in for rescue.
- . Place ladders on each side of the shored area, close to the men working.
- . Don't use power equipment to dig directly over victims (see Trench Rescue SOP, Backhoe Rescue).
- . Relay dirt down the trench for removal or use buckets.
- . Uncover victim's head and chest first to enable him to breath.
- . Use caution in removal of the shoring. Work from shored areas and outside the trench.